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DOE/RL-2003-42
Revision 0

Radioactive Air Emissions Notice of Construction for Plutonium Finishing Plant Decontamination Trailer

August 2003

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

United States Department of Energy
P.O. Box 550
Richland, Washington 99352

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-96RL13200

Chris Wellingham 8/20/03
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TERMS

ALARA	as low as reasonably achievable
ALARACT	as low as reasonably achievable control technology
BARCT	best available radionuclide control technology
CFR	Code of Federal Regulations
Ci	curie
cm^2	square centimeters
DOE-RL	U.S. Department of Energy, Richland Operations Office
dpm	disintegrations per minute
HPT	health physics technician
MEI	maximally exposed individual
mrem	millirem
MPR	maximum public receptor
NESHAP	National Emission Standards for Hazardous Air Pollutant
NOC	notice of construction
PCM	periodic confirmatory measurements
PTE	potential to emit
RWP	radiation work permit
SEPA	*State Environmental Policy Act of 1971*
TEDE	total effective dose equivalent
WAC	Washington Administrative Code
WDOH	Washington State Department of Health

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.03937	inches
inches	2.54	centimeters	centimeters	0.393701	inches
feet	0.3048	meters	meters	3.28084	feet
yards	0.9144	meters	meters	1.0936	yards
miles (statute)	1.60934	kilometers	kilometers	0.62137	miles (statute)
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.09290304	square meters	square meters	10.7639	square feet
square yards	0.8361274	square meters	square meters	1.19599	square yards
square miles	2.59	square kilometers	square kilometers	0.386102	square miles
acres	0.404687	hectares	hectares	2.47104	acres
Mass (weight)			**Mass (weight)**		
ounces (avoir)	28.34952	grams	grams	0.035274	ounces (avoir)
pounds	0.45359237	kilograms	kilograms	2.204623	pounds (avoir)
tons (short)	0.9071847	tons (metric)	tons (metric)	1.1023	tons (short)
Volume			**Volume**		
ounces (U.S., liquid)	29.57353	milliliters	milliliters	0.033814	ounces (U.S., liquid)
quarts (U.S., liquid)	0.9463529	liters	liters	1.0567	quarts (U.S., liquid)
gallons (U.S., liquid)	3.7854	liters	liters	0.26417	gallons (U.S., liquid)
cubic feet	0.02831685	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.7645549	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.94782	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds (force) per square inch	6.894757	kilopascals	kilopascals	0.14504	pounds per square inch

06/2001

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Third Ed., 1990, Professional Publications, Inc., Belmont, California.

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION FOR PLUTONIUM FINISHING PLANT DECONTAMINATION TRAILER

This document serves as a notice of construction (NOC) pursuant to the requirements of Washington Administrative Code (WAC) 246-247-060, and as a request for approval to construct pursuant to 40 Code of Federal Regulations (CFR) 61.07, for operation of a decontamination trailer at the Plutonium Finishing Plant (PFP) Complex.

Emergency decontamination of personnel who have external radioactive contaminants on clothing and/or skin could be required in the event of an accident during operations at the PFP on the Hanford Site. Typically, such contamination would be treated immediately and directly at the location of the event (e.g., within a building or job site). However, it might be necessary to provide additional decontamination capabilities in an isolated location within the PFP Complex to minimize personnel exposure and to minimize the potential for spread of radioactive contamination offsite. The decontamination trailer would be stationed within the PFP Complex fenceline.

The estimated potential total effective dose equivalent (TEDE) to the maximally exposed individual (MEI) resulting from the unabated radioactive emissions from operation of the decontamination trailer is 1.5 E-6 millirem per year. Because there is no abatement equipment proposed for the decontamination trailer, the abated TEDE to the MEI also is 1.5 E-6 millirem per year.

1.0 LOCATION

Name and address of the facility, and location (latitude and longitude) of the emission unit:

The PFP Complex is located in the 200 West Area (Figure 1). The address for the PFP Complex and geodetic coordinates are as follows:

U.S. Department of Energy, Richland Operations Office (DOE-RL)
Hanford Site
Richland, Washington 99352
200 West Area, PFP Complex

46° 32' 59" North Latitude
119° 37' 59" West Longitude.

2.0 RESPONSIBLE MANAGER

Name, title, address and phone number of the responsible manager:

Mr. Matthew S. McCormick, Assistant Manager for Central Plateau
U.S. Department of Energy, Richland Operations Office
P.O. Box 550
Richland, Washington 99352
(509) 372-1786.

3.0 PROPOSED ACTION

Identify the type and proposed action for which this application is submitted.

The proposed action is to decontaminate personnel who have been contaminated with radioactive material. In an inadvertent release, personnel could be exposed to radioactive contamination. Initial decontamination activities would take place at the location of the release. If additional decontamination is warranted, personnel would be transferred to the decontamination trailer.

Decontamination activities would include removal and packaging of contaminated clothing and isolation/removal of skin contamination.

- Before transport of personnel to the decontamination trailer, appropriate measures would be taken to contain potentially dispersible contamination. To the extent practicable, contaminated clothing would be removed and disposed. Any remaining contamination would be isolated by bagging, taping, or other appropriate means.

- Inside the trailer, any additional contaminated coverings (e.g., coveralls, modesty clothing) would be removed, as appropriate, and packaged (e.g., plastic bags) for disposition. Various means to reduce/remove skin contamination would be used as appropriate. For small areas of contamination, scrubbing with soap and water or chemical cleaner would be used. For gross contamination, shower(s) would be used, followed by scrubbing(s).

All potentially radiologically contaminated liquid would be collected and contained in a catch tank located beneath the decontamination trailer; the trailer vents directly to the atmosphere.

The anticipated emissions associated with this activity are insignificant.

4.0 STATE ENVIRONMENTAL POLICY ACT

If the project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number.

The proposed action categorically is exempt from the requirements of SEPA under WAC 197-11-845.

5.0 PROCESS DESCRIPTION

Describe the chemical and physical processes upstream of the emission unit.

A description of the decontamination activities in the decontamination trailer are provided in the following sections.

5.1 FACILITY DESCRIPTION

The decontamination trailer is a camper-type trailer as shown in Figures 2 through 4. The trailer will be used only when initial decontamination efforts at the immediate location of contamination cannot be completed. Aside from a bathroom-type ventilation fan, the trailer has no active ventilation system.

Direct releases to the atmosphere occur through the ceiling fan ductwork and door openings (the latter are 6 to 10 feet above the ground surface).

5.2 DECONTAMINATION ACTIVITIES

All work would be performed in accordance with approved radiological control methods and as low as reasonably achievable (ALARA) program requirements. These requirements would be carried out through activity work packages and associated radiological work permits.

The general chemical and physical processes associated with decontamination activities in the decontamination trailer would consist of the following.

- On identification of the need for additional decontamination of personnel, affected individuals would be escorted to the decontamination trailer.

- As appropriate, contaminated clothing, coverings, and/or articles would be removed, packaged, and dispositioned in accordance with applicable facility waste handling procedures.

- Personnel decontamination processes might include various methods or a combination of cleaning agents and/or chemicals. For example: soap and water, pre-moistened towelettes, shaving cream-type foam decontamination agents for facial areas; removal of hair; and abrasive soaps for toughened skin surfaces (e.g., hands and feet).

- Spent decontamination solutions would be transferred from the decontaminated liquid holding tank and containerized (e.g., packaged in absorbents in drums or placed in drums or carboys) and transported to existing facilities on the Hanford Site for disposal.

- Periodic maintenance inspections of the decontamination trailer would be performed without use of containment or portable exhausters.

6.0 PROPOSED CONTROLS

Describe the existing and proposed abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate in cubic meters/second for the emission unit.

There is no abatement control technology associated with the decontamination trailer, but is vented actively with an unfiltered ceiling fan. Many of the emission controls used for the diffuse and fugitive emissions during decontamination operations are administrative, based on ALARA principles and consist of ALARA techniques. The decontamination operations would be performed in accordance with the controls specified in a radiation work permit (RWP). It is proposed that the controls specified in the RWP in effect at the time of operations be approved as low as reasonably achievable control technology (ALARACT) for the decontamination activities.

Airborne radioactive emissions resulting from the decontamination operations would be minimal because of the following.

- All activities would be conducted under the auspices of radiological control technicians.

- The expected frequency of personnel contaminations requiring the use of the decontamination trailer would be very small (estimate less than 10 times per year).

- The maximum radionuclide inventory associated with personnel contamination would be very small. Initial decontamination would be conducted at the immediate location of the event; only residual contamination would be associated with personnel escorted to the decontamination trailer.

- The likelihood of airborne particulate emissions being generated from any contaminated clothing would be very small as the significant portion of the radionuclide inventory would be contained within the matrix of the fabric. The methods and processes used to remove and package the clothing likely would not generate substantial airborne radionuclide contaminants.

7.0 DRAWINGS OF CONTROLS

Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment.

Conceptual drawings are not applicable because the emissions controls to be used during these activities are defined administratively, based on ALARA principles and consist of ALARA techniques. There is no radionuclide abatement control technology equipment proposed for the decontamination operations; the decontamination trailer is ventilated through an unfiltered ceiling fan, and door and windows.

8.0 RADIONUCLIDES OF CONCERN

Identify each radionuclide that could contribute greater than ten percent of the potential to emit TEDE to the MEI, or greater than 0.1 mrem/yr potential to emit TEDE to the MEI.

Isotopes of plutonium and americium might be present in the decontamination trailer based on process knowledge of PFP operations. The radionuclides of concern for this activity are calculation-based. As shown in Table 1, conservative dose/emission calculations are based on alpha contamination, as represented by plutonium-239.

9.0 MONITORING

Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential to emit TEDE to the MEI, or greater than 0.1 mrem/yr potential to emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with sufficient detail to demonstrate compliance with the applicable requirements.

The potential unabated offsite dose associated with this activity is calculated to be less than 0.1 millirem per year. Therefore; in accordance with 40 CFR 61, Subpart H, periodic confirmatory measurements (PCM) would be made to verify the low emissions.

Diffuse/fugitive emissions would be monitored using the 200 West Area near-field ambient air monitors (PNNL-13910). Sample collection and analysis would follow that of the near-field monitoring program. Analytical results would be reported in an annual air emissions report. Currently this program measures and reports alpha and beta ambient air activity every 2 weeks. Isotopic analysis currently is determined and reported every 6 months. The sampling frequency is subject to change; however, the ambient air quality program remains the mechanism for satisfying the requirement for PCM.

The proposed PCM for the diffuse and fugitive emissions also would include radiological surveys during personnel decontamination operations (e.g., smears and hand-held radiation monitoring measurements on the interior/exterior of the decontamination trailer). These methods of PCM are not a direct measurement of effluent emissions. The methods are intended to demonstrate compliance by showing that being under the contamination levels by which work is controlled, the actual emissions inherently would be below the estimated emissions, which would be based and calculated from the same contamination levels.

10.0 ANNUAL POSSESSION QUANTITY

Indicate the annual possession quantity for each radionuclide.

The annual possession quantity is based on alpha (as plutonium-239). For conservatism, 1.4 E-4 curies alpha (including fixed contamination) would be assumed to be associated with personnel contamination in a calendar year.

11.0 PHYSICAL FORM

Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas.

The physical form of the radionuclides in the decontamination trailer would be solid and particulate solid.

12.0 RELEASE FORM

Indicate the release form of each radionulcide in inventory: Particulate solids, vapor or gas. Give the chemical form and ICRP 30 solubility class, if known.

For (conservative) purposes of emission and offsite dose estimates, the release of the radionuclides in the inventory presented in Section 10.0 are assumed to be in the form of particulate solids.

13.0 RELEASE RATES

Give the predicted release rates without any emissions control equipment (potential to emit) and with the proposed control equipment using the efficiencies described in subsection (6) of this section. Indicate whether the emission unit is operating in a batch or continuous mode.

The predicted release rates for each radionuclide, without any emissions control equipment (unabated), are presented in Table 1 using the appropriate WAC 246-247-030 (21)(a) release fractions. The total potential release rates for the radionuclides of concern (unabated) are summarized in Table 2. Because there are no abatement controls proposed, the abated releases are the same as unabated releases.

The decontamination trailer would operate in a batch mode, used in the event of accidental personnel contamination. The actual and potential fugitive emissions from the proposed activities are not expected to be measurable and therefore are not included in Tables 1 and 2.

14.0 LOCATION OF MAXIMALLY EXPOSED INDIVIDUAL

Identify the MEI by distance and direction from the emission unit.

The maximum public receptor (MPR) was assumed to be a non-DOE worker who works within the Hanford Site boundary and who eats food grown regionally. The MPR was assumed to be located at the Laser Interferometer Gravitational Wave Observatory (LIGO) (Figure 1). LIGO is approximately 22,000 meters southeast from PFP.

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Calculate the TEDE to the MEI using an approved procedure. For each radionuclide identified in sub section (8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any existing controls using the release rates from subsection 13 of this section. Provide all input data used in the calculations.

The CAP88 PC computer code was used to model atmospheric releases using Hanford Site-specific parameters[1]. The MPR was assumed to be located at LIGO. Using those calculated unit dose conversion factors, the estimated potential TEDE to the MEI resulting from the unabated fugitive emissions from decontamination trailer activities is 1.5 E-6 millirem per year (refer to Table 2). There is no abatement technology, so the abated TEDE also is 1.5 E-6 millirem per year (Table 2).

The TEDE from all 2001 Hanford Site air emissions (point sources, diffuse, and fugitive sources) was 0.049 millirem (DOE/RL-2002-20). The emissions resulting from the operation of the PFP decontamination trailer, in conjunction with other operations on the Hanford Site, would not result in a violation of the National Emission Standard of 10 millirem per year (40 CFR 61, Subpart H).

16.0 COST FACTORS OF CONTROL TECHNOLOGY COMPONENTS

Provide cost factors for construction, operation, and maintenance of the proposed control technology components and the system, if a BARCT or ALARACT demonstration is not submitted with the NOC.

There are no control technology components or systems; therefore, there are no cost factors associated with the proposed activity. The emission controls used during the decontamination activities administratively would be defined and consist of ALARA principles and techniques.

[1] Permission to use Hanford Site-specific parameters granted in letter from D.E. Hardesty of EPA to J.B Hebdon at DOE-RL, dated March 22, 2001, Subject: U.S. Environmental Protection Agency's third response to the new maximally exposed individual definition.

17.0 DURATION OR LIFETIME

Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.

Decontamination trailer operations would be conducted on an as-needed basis; the expected life of the trailer would be approximately 20 years.

18.0 STANDARDS

Indicate which of the following control technology standards have been considered and will be complied within the design and operation of the emission unit described in this application:

ASME/ANSI AG-1, ASME/ANSI N509, ASME/ANSI N510, ANSI/ASME NQA-1, 40 CFR 60, Appendix A Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17, and ANSI N13.1.

The listed control technology standards have been considered. No abatement control equipment is proposed. The administratively defined ALARA based emission controls proposed for these decontamination activities are adequate to limit and control emissions.

19.0 REFERENCES

DOE/RL-2002-20, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2001*, June 2001, U.S. Department of Energy, Richland, Washington.

HNF-3602, Revision 1, *Calculating Potential to Emit Releases and Doses for FEMPs and NOCs*, January 2002, Fluor Hanford, Richland, Washington.

PNNL-13910. Appendix 2, Hanford Site Near-Facility Environmental Monitoring Data Report for Calendar Year 2001, September 2002, Pacific Northwest National Laboratory, Richland, Washington.

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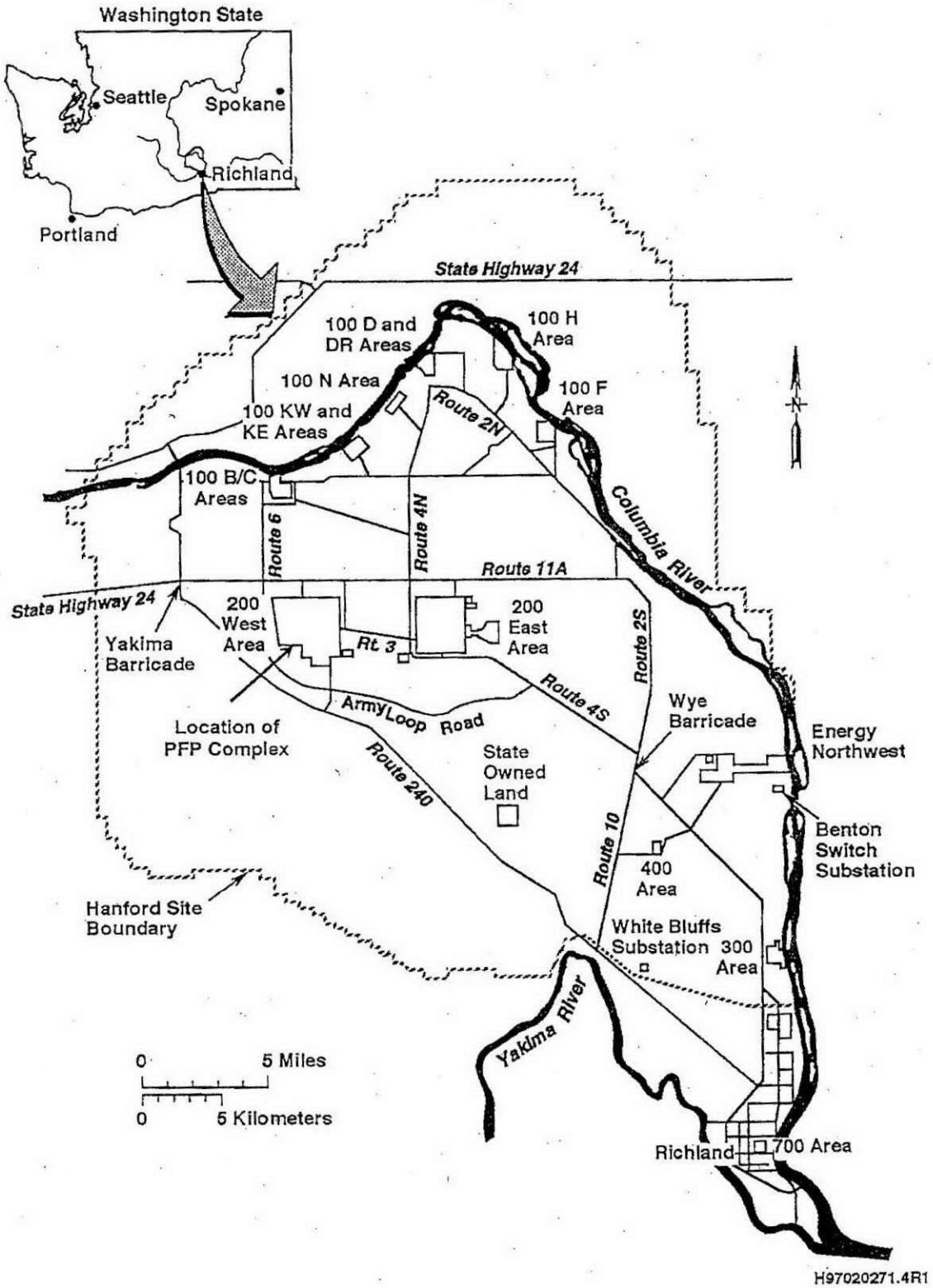

Figure 1. Hanford Site.

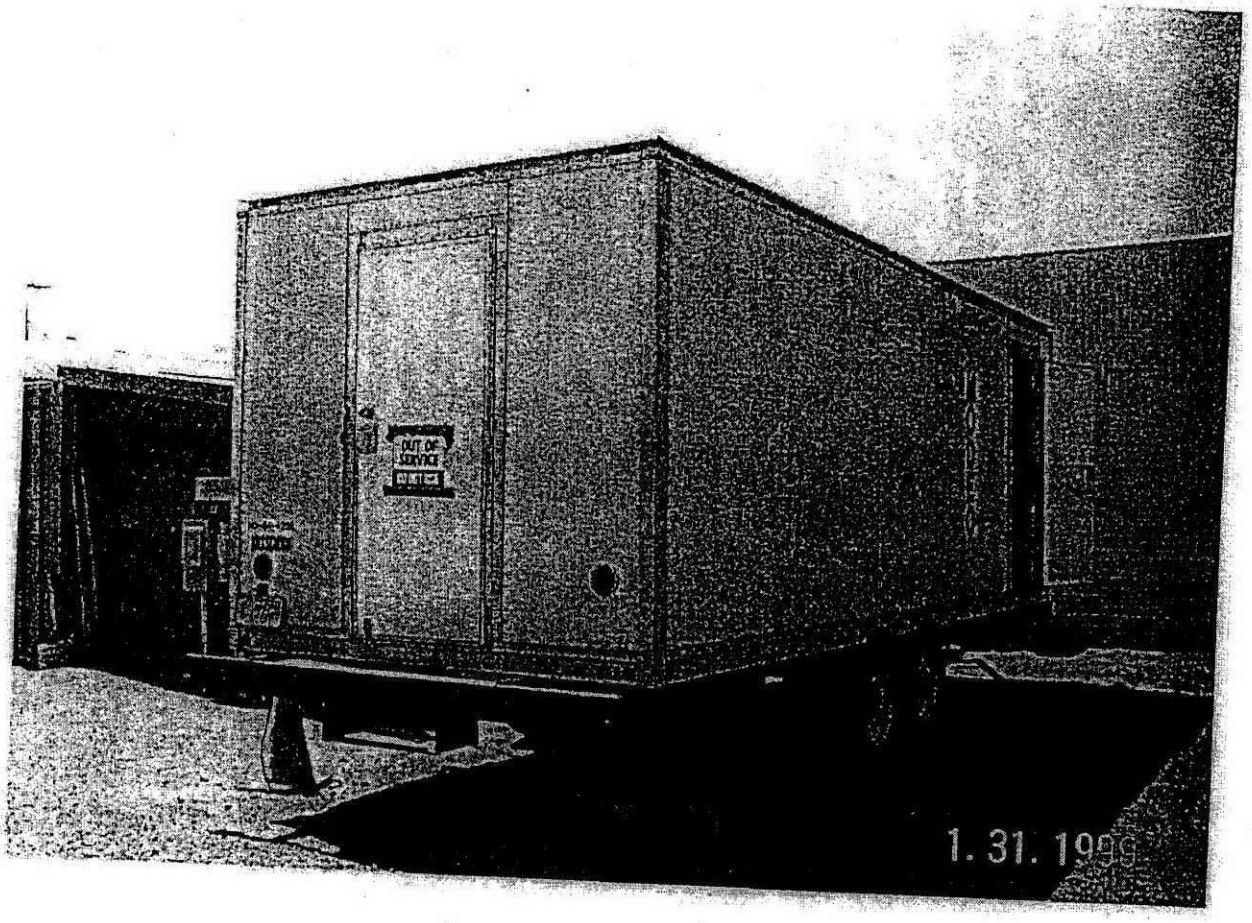

Figure 2. Exterior View of Decontamination Trailer.

Figure 3. Interior View of Decontamination Trailer.

Figure 4. Shower in Decontamination Trailer.

Table 1. Decontamination Trailer Inventory.

Radionuclides	**Physical Form**	**Inventory (curies)**	**WAC 246-247 Release Fraction**	**Potential Release (curies/year)**
Plutonium-239	particulate	1.4 E-4	1.0 E-3	1.4 E-7

Table 2. Decontamination Trailer Potential to Emit.

Radionuclides	Potential Unabated Release (curies/year)	Potential Abated Release (curies/year)	Dose Factor CAP88-PC* (millirem/curie)	Unabated Onsite Public Dose (millirem/year)	Abated Onsite Public Dose (millirem/year)
Plutonium-239	1.4 E-7	1.4 E-7	11	1.5 E-6	1.5 E-6
Total				**1.5 E-6**	**1.5 E-6**

* HNF-3602, Rev. 1

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Enclosure 2

NOTICE OF OFF-PERMIT CHANGE FOR THE HANFORD SITE AIR OPERATING PERMIT (AOP) (NUMBER 00-05-006) FOR RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION (NOC), DOE/RL-2003-42, REVISION 0, PLUTONIUM FINISHING PLANT DECONTAMINATION TRAILER

HANFORD SITE AIR OPERATING PERMIT

Notification of Off-Permit Change

Permit Number: 00-05-006

This notification is provided to Washington State Department of Ecology, Washington State Department of Health, and the U.S. Environmental Protection Agency as notice of an off-permit change described as follows.

This change is allowed pursuant to WAC 173-401-724(1) as:
1. Change is not specifically addressed or prohibited by the permit terms and conditions
2. Change does not weaken the enforceability of the existing permit conditions
3. Change is not a Title I modification or a change subject to the acid rain requirements under Title IV of the FCAA
4. Change meets all applicable requirements and does not violate an existing permit term or condition
5. Change has complied with applicable preconstruction review requirements established pursuant to RCW 70.94.152.

Provide the following information pursuant to WAC-173-401-724(3):

Description of the change:
A Radioactive Air Emissions Notice of Construction, *Radioactive Air Emissions Notice of Construction for Plutonium Finishing Plant Decontamination Trailer*, Revision 0, is being submitted to the Washington Department of Health (Health) for approval and the U.S. Environmental Protection Agency (EPA) for information. A change in the Hanford Site Air Operating Permit is required to indicate this source of air emissions.
Date of Change:
Effective date will be the approval by DOH of the NOC.
Describe the emissions resulting from the change:
Radioactive air emissions with the total estimated unabated and abated effective dose equivalents to the hypothetical, maximally exposed public individual are 1.5 E-06 millirem per year, respectively.
Describe the new applicable requirements that will apply as a result of the change:
Applicable requirements will be identified in approval notification by Health.
For Hanford Use Only:
AOP Change Control Number: | Date Submitted: